REMARKS

Reconsideration of this application is respectfully requested in view of the foregoing amendment and the following remarks.

Claims 1-20 are pending. Claims 1-20 have been rejected. Claims 1, 5-6, 10, 12 and 14 have been amended. This amendment is believed not to introduce new matter and its entry is respectfully requested. Accordingly, claims 1-20 will be pending herein upon entry of this Amendment. For the reasons stated below, Applicant respectfully submits that all claims pending in this application are in condition for allowance.

Paragraph 2 of the Office Action rejects claims 1-8 as allegedly being anticipated by U.S. Patent No. 6,133,871 to Krasner ("Krasner"). Applicants have amended claim 1 to overcome the rejection. Krasner is directed to system GPS receiver and method for determining the position of a remote GPS receiver. The receiver and method both rely on the transmission of Doppler information to the remote from a base station so that the position of the remote can be determined (Krasner, col. 4, ll. 34-39). By sending the Doppler information to the remote, the remote is freed from the burden of having to search for the Doppler, thereby reducing processing time in excess of a factor of ten, which in turn reduces power consumption by the remote. (Krasner, col. 5, ll. 56-65).

The present invention, on the other hand, as recited in claim 1, includes, "carrier frequency acquisition means for determining a carrier frequency associated with the downconverted GPS signal based on a height of the peak," and as recited in claim 6, includes "means for determining a carrier frequency using a height of the peak."

Applicants respectfully assert that Krasner does not disclose the recited elements of claims 1 or 6. Rather than determine a carrier frequency associated with the downconverted GPS signal based on a height of a peak in the correlation signal as set forth in claims 1 and 6, Krasner sends Doppler information to the remote so that it knows what carrier frequency to use. This is a key distinction between Krasner and the present invention as recited in claims 1 and 6. The GPS receiver in Krasner (*i.e.*, the receiver in the remote) does not determine the carrier frequency in the manner recited in claim 1. Rather the appropriate carrier frequency is sent to the remote from the base station in the form of a Doppler offset as described above. Consequently, Applicants respectfully submit that the carrier frequency determination element of claims 1 and 6 is not disclosed in Krasner. As a result, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 1, and its independent claim 2-4 and claim 6 and its dependent claims 7-8.

With respect to claims 5 and 7, the Office Action rejects these claims as being anticipated by Krasner at col. 14, ll. 30-46. Applicants respectfully disagree. This portion of Krasner described time shifting blocks of PN frames to compensate for Doppler shift from one block to the next. This is required because Krasner describes operating on blocks of PN frames corresponding to a relatively large amount of data, typically from 100 ms to 1 second (Krasner, col. 12, ll. 8-13).

Claims 5 and 7 are directed to a frequency shift to determine the correct carrier frequency, not a time shift. Consequently, the operation Applicants perform in the invention described by claims 5 and 7 is different in kind than what is referred to in Kranser in the

rejection of these claims. Krasner does not describe such a frequency shift to determine Doppler. Rather Krasner is provided the Doppler from a base station as described above. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 5 and 7 on this independent ground as well.

Paragraph 4 of the Office Action rejects claims 9-20 as allegedly being obvious in view of Krasner. Applicants respectfully traverse the rejection with respect to claims 9-13. Applicants have amended claims 14-20 to overcome the rejection.

Claim 9 recites "storing a one millisecond segment of the GPS signal in a memory" and then performing the processing described in the remainder of the claim on the stored one millisecond segment. As described in column 12, lines 10-13, Krasner collects K PN frames of data for processing, where K is typically 100 to 1000 (corresponding to 100ms to 1 second of data). Nowhere, however, does Krasner teach or suggest the case where K is 1. In fact, Krasner expressly teaches away from K being 1 by reciting PN *frames*, using the term "frames" in the plural." Moreover, Krasner processes the signal in blocks of N consecutive PN frames. Thus, the processing loop shown in Figure 3 is performed "a total of K/N times for each GPS signal to be processed." (Krasner, col. 12, ll. 22-30), far more than the one millisecond segment recited in claim 9.

Thus, Applicants respectfully assert that Krasner neither teaches nor discloses processing for a one millisecond segment of data as recited in claim 9. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 9 and its dependent claims 10-13.

Claim 14 has been amended to recite the step of "determining a carrier frequency using the located peaks." As described above, the remote in Krasner is provided with Doppler information from a base station. Consequently, Krasner does not have to perform the step of determining a carrier frequency using the located peaks as recited in claim 14. Moreover, Krasner teaches away from having to make this determination as it would require the remote to search for the Doppler, thereby reducing processing time in excess of a factor of ten, which in turn reduces power consumption by the remote. (Krasner, col. 5, ll. 56-65). Thus, Applicants respectfully assert that Krasner neither teaches nor suggests the step of "determining a carrier frequency using the located peaks" as described in claim 14. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 14 and its dependent claims 15-20.

With respect to claim 13, Applicants further provide an independent ground to overcome the rejection. Claim 13 is directed to frequency shifting to refine the carrier frequency, not time shifting. As described above, Krasner neither teaches nor suggests such frequency shifting. Accordingly, Applicants respectfully request that Examiner to consider and withdraw the rejection of claim 13 on this independent ground as well.

In view of the foregoing all of the claims pending in this case are believed to be in condition for allowance. Should the Examiner have any questions or determine that any further action is desirable to place this application in even better condition for issue, the Examiner is encouraged to telephone applicants' undersigned representative at the number listed below.

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Attachments: Amended Claims w/ Markings

DCI/ca

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Once amended) A GPS receiver, comprising:

an antenna to collect a GPS signal that is a composite signal comprising a contribution from each GPS satellite in view of the receiver;

a signal conditioning processor to amplify, filter and downconvert the GPS signal to baseband;

an A/D converter to digitize the GPS signal at a pre-determined sample rate;

a memory to store a portion of the GPS signal;

an FFT process to convert the portion of the GPS signal stored in the memory to the frequency domain;

a multiplier for multiplying the frequency representation of the stored GPS signal with a frequency representation of a Gold code associated with one of the GPS satellites in view of the GPS receiver and for storing the result in the memory as a product;

an inverse FFT process for converting the product to the time domain as a convolution; [and]

a peak detector to find a location of a peak in the convolution, the location of the peak being an estimate of the Gold code phase[.]; and

carrier frequency acquisition means for determining a carrier frequency associated with the downconverted GPS signal based on a height of the peak.

5. (Once amended) The GPS receiver recited in claim [5] 4, wherein the means for adjusting carrier frequency [comprise] comprises means for performing a half-bin analysis.

6. (Once amended) A GPS receiver to receiver and detect a composite GPS signal comprising GPS signals from all GPS satellites in view of the GPS receiver, comprising:

an antenna to receive the composite GPS signal;

a memory to store a portion of the received composite GPS signal;

means for segmenting the stored GPS signal into plurality of segments[;], each segment one millisecond in duration;

an FFT process to perform an FFT on each segment;

a plurality of multipliers to multiply each FFT segment by a frequency representation of a GPS Gold code to generate a plurality of product vectors;

an inverse FFT process to convert each product vector to the time domain;

a magnitude calculator to calculate a point-by-point magnitude vector of each of the [magnitude] <u>product</u> vectors;

an adder to calculate a point-by-point sum of each of the magnitude vectors;

a peak detector to determine a <u>location of a</u> peak [location] as an estimate of the Gold code phase[.]<u>; and</u>

<u>means for determining a carrier frequency using a height of the peak.</u>

10. (Once amended) The method recited in claim 9, further comprising the step of adjusting [a] <u>the</u> carrier frequency of the one millisecond sample to make the peak more distinct.

12. (Once amended) The method recited in claim 9, further comprising the step of using a curve fitting [routing] <u>routine</u> to refine the location of the peak.

14. (Once amended) A method for detecting Gold code phase and carrier frequency in a GPS signal comprising the steps of:

collecting a multiple millisecond portion of a composite GPS signal in a GPS receiver;

storing the portion of the composite GPS signal in a memory in the GPS receiver;

partitioning the collected composite into one millisecond segments;

converting each one millisecond segment to the frequency domain;

multiplying each of the converted millisecond segments by a frequency representation of a Gold code corresponding to a GPS satellite in view of the receiver to generate a product;

converting each product to the time domain to obtain a correlation signal between each millisecond segment and the Gold code; [and]

determining a <u>location of a </u>peak in each of the one millisecond segments [location] corresponding to a Gold code phase using the correlation signals[.]<u>; and</u>

<u>determining a carrier frequency using the located peaks.</u>